## REMARKS

### I. Status of claims

Claim 1 is currently amended. Upon entry of the amendments, claims 1-7, 9-18, and 70 are pending. Claim 71 is added, which finds support in originally filed claim 1. No new matter is added.

Applicants thank Examiner Wartalowicz for the courteous and helpful discussions held with Applicants' undersigned representative and Mr. Marty Rupich on April 7, 2009. The substance of the interview is summarized below.

At the outset, Applicants wish to direct the Examiner's attention to the Restriction Requirement Response dated October 29, 2007, in which Applicants elected the claims directed to method of producing a film that includes a *dopant metal*, and not a *secondary phase forming additive*.

The non-elected claims, which were filed in a divisional application (U.S. Patent Application No. 12/346,421), are directed to a method for producing a film that includes a secondary phase forming additive. Such additives form separate phases. Moreover, when compared to defects that occur by substitution into the atomic lattice sites of the superconductor, the secondary phases are significantly larger in size.[1]

In contrast, the elected claims are directed to, *inter alia*, a dopant metal which substitutionally replaces the rare earth of the rare-earth/alkaline-earth-metal/transition metal oxide. In other words, the dopant metals atomistically substitutes into the lattice sites of the oxide superconductor.

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[1] Although Applicants do not address in this response the merits of the methods and materials in the cited reference in forming pinning cites through secondary phase forming additives, Applicants reserve the right to address this issue at a later point, if necessary.

## II. Rejections under 35 USC §103

Claims 1, 4-7, 9-18, and 70 are rejected as set forth in the Office Action over Riley (WO 01/08169), Weinstein (US 6525002), Babu (New chemically stable…), Jin (Superconducting properties of…), Feenstra (US 5972847) and/or McDevitt (US 5591696). Applicants respectfully disagree. In particular, the cited references do not teach or suggest, alone or in combination, a precursor solution to a high temperature oxide superconductor film that includes "a dopant component comprising a dopant metal, wherein the dopant metal partially replaces one or more of the rare earth of the rare-earth/alkaline-earth-metal/transition metal oxide in the precursor solution." Furthermore, the cited references do not teach or suggest "heating the intermediate film to form an oxide superconductor that contains one or more defects that serve as flux pinning centers, wherein the oxide superconductor comprises the dopant metal."

Riley is directed to fabricating coated conductors. However, as the Office Action notes, Riley fails to teach any dopant metals (see page 4 of Office Action). To remedy the deficiency of Riley, the Office Action relies on Weinstein or Babu.

However, Babu describes $Y_2Ba_4CuMO_y$ phase inclusions (particles) in YBCO produced through a melt processing method (see Abstract and L44). Moreover, when these materials are mixed with YBCO materials using a melt processing method, Babu specifically notes that "the transition metal elements, M, do not substitute into the Y-123 lattice during the melt process (i.e. the $Y_2Ba_4CuMO_y$ phase is chemically inert with respect to the YBCO system)" (L44, right column). More specifically, Babu notes that when using $Y_2Ba_4CuNdO_y$ particles, they observe an "absence of solid solution formation of the type $Nd_{1-x}Y_xBa_2Cu_3O_{7-\delta}$." (L45, left column).

Weinstein also generally describes YBCO superconductor having an array of a *secondary phase additive* dispersed throughout the superconducting material (see, e.g., col. 3, lines 55-61 and col. 4, lines 19-33, which mentions that these defects are about 1 to 1000 nm in size). These secondary phase defects are produced through neutron irradiation (see col. 3, lines 20-30).

In contrast, claim 1 is directed to a method for producing an oxide superconductor, where the oxide superconductor film comprises the dopant metals, which partially *replaces one or more of the rare earth* of the rare-earth/alkaline-earth-metal/transition metal oxide. Neither Weinstein nor Babu describes substitution into *rare earth* lattice sites. The only mention regarding substitution is in Weinstein, which only generally states that "[t]he neutron-fissionable element substitutionally replaces one or more elements of the above superconducting materials." (Col. 6, lines 12-14). No specific lattice sites into which the neutron-fissionable element can substitute into is mentioned. Moreover, there is no indication that flux pinning centers would form after the neutron-fissionable element substitutes into one of the lattice sites and prior to the neutron irradiation.

In fact, the prior art does not teach or suggest that rare earth lattice site substitute leads to formation of flux pinning sites. Jin describes a rare earth lattice site substituted YBCO produced by grinding, pressing and sintering, and without any neutron irradiation (see page 76, left column; and page 78, left and right columns). However, Jin notes that the "observed improvement in $\Delta M$ and intragrain $J_c$ . . . may be viewed as relatively insignificant." (page 78, left column). Jin discloses a method for introducing a rare earth element into a high temperature superconducting composition using a significantly different method (grinding, pressing and sintering techniques (see page 76, left column)) and fails to produce flux pinning sites. Moreover, Jin even goes so far as to *teach away* from the claims by noting that the "insignificant flux pinning enhancement by Y-site substitution suggests that future efforts should perhaps be concentrated on Ba-, Cu-, or O-site substitutions." (page 78, right column).

Feenstra and McDevitt also fail to remedy the deficiencies noted above. Feenstra is silent to any form of rare earth lattice site substitution of the rare-earth/alkaline-earth-metal/transition metal oxide.

McDevitt aims to alter the surface properties (i.e., improved corrosion resistance) of the superconductor by *reducing* the lattice strain (see col. 3, lines 21-34) through substitution into the rare earth *and* alkaline earth metal lattice sites; such objective to reduce the lattice strain is contrary to the pending claims. The pending claims recite that the oxide superconductor contains one or

more defects that serve as flux pinning centers, because (without wishing to be bound by theory), it is generally thought that "with an atomistically random mixture of rare earths through the thickness of the film, [t]his random structure gives rise to strains and atomic energy perturbations, which can pin magnetic flux in the superconductor." (page 23, lines 12-14).

In summary, the cited art either teaches the formation of secondary phases, teaches that addition of a rare earth does not lead to flux pinning or discloses methods for reducing the strain in the high temperature oxide material. For at least these reasons, Applicants submit that the cited references, either alone or in combination, fail to obviate claim 1, and the claims dependent thereon. In view of the above amendments and remarks, Applicants believe the application is now in condition for allowance. Early notification of such is earnestly solicited.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 08-0219, under Order No. 0002802.00174US1 from which the undersigned is authorized to draw.

Respectfully submitted,

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